

Draft USDOT Value Pricing Pilot Program Project Proposal: Assessment of a High-Occupancy Toll (HOT) Lane from Northern New Jersey to Midtown Manhattan

Congestion Problem To Be Addressed

The interstate transportation corridor linking northern New Jersey with New York City's Manhattan Central Business District (CBD) is among the most intensely utilized transportation infrastructure in the nation. This Midtown Corridor connects the NJ Turnpike/I-95, Routes 1&9, and Routes 3 and 21 through Route 495 in New Jersey with the Queens Midtown Tunnel and LIE/I-495. Bus service to the PABT and rail service to Penn Station connects with the New York City Transit subway and bus services.

The Midtown Corridor benefits from the wide variety of transportation modes that serve the mobility needs of the region's core, including NJ Transit/Amtrak passenger rail services, PATH's transit services, private ferry operations, as well as the Port Authority Bus Terminal (PABT) in midtown Manhattan, the Lincoln Tunnel, and the Exclusive Bus Lane (XBL), which provides priority treatment for morning peak-period buses destined through the Lincoln Tunnel to the PABT.

Despite the array of travel options, the Midtown Corridor normally experiences extensive traffic congestion on its roadways, particularly during peak hours. The criticality of this corridor has been heightened since September 11, 2001, as office and business activity that was dislocated from Lower Manhattan has relocated to Midtown Manhattan. In addition, disruptions to travel patterns to Lower Manhattan due to the loss of PATH's downtown World Trade Center services and continued vehicular restrictions at the tunnels and bridges below 14th Street, have added to the importance of the Midtown Corridor accommodate traffic demand efficiently.

In the future, travel demand in the Midtown Corridor is expected to grow strongly, as the redevelopment of the Times Square area continues, and New York City explores options to rezone and redevelop the far West Side of Midtown Manhattan. In addition, the recent announcement of New York City as the U.S. candidate to host the 2012 Olympics heightens the need to find new mobility solutions in preparation for the games. While commuter rail expansion continues to be pursued for Midtown access, significant capacity additions will be many years away. In the meantime, the interstate bus transportation system will continue to play a major role in transit-based travel options to Midtown Manhattan. The efficiency of the bus system serving the Midtown Corridor is essential to ensuring the most effective utilization of the scarce roadway capacity for moving both people and goods. The efficiency and reliability of bus service in the corridor also will be a major factor in ensuring that bus transit options are attractive alternatives to automobile use in the Midtown Corridor.

Study Proposal Overview

This objective of this proposal is to determine whether value pricing and High-Occupancy Toll (HOT) lanes might be used to balance a mix of non-bus traffic with the excess capacity of a proposed potential second Exclusive Bus Lane on NJ Route 495 leading to the Lincoln Tunnel and Midtown Manhattan. Due to the current congestion and expected future increases in bus

traffic through the Lincoln Tunnel corridor, The Port Authority of New York and New Jersey (PANYNJ) is undertaking a study in conjunction with the Federal Transit Administration to assess the feasibility of converting one of the three eastbound traffic lanes on NJ Route 495 into a second Exclusive Bus Lane (XBL II) to provide additional priority treatment for buses during the a.m. peak period.

The objective of the proposed XBL II is to increase overall passenger throughput in the Midtown Corridor and enhance the overall reliability of the current XBL operation, which operates at its physical capacity each weekday morning. Converting a regular travel lane of Route 495 to a managed lane treatment poses several concerns:

- the level of service and increased delay in the remaining two regular travel lanes;
- the traffic queuing in the remaining regular travel lanes and the residual impacts on other roadways in the Corridor, including the local street network in the vicinity of Route 495;
- the need to balance demand for a new managed lane between buses and some other priority treatment, ensuring effective capacity utilization.

Current levels of bus traffic in the Midtown Corridor suggest that while the current Exclusive Bus Lane operates at and beyond its capacity, a second Exclusive Bus Lane will be underutilized as a bus-only lane. Therefore, the PANYNJ is interested in identifying options to allow other vehicles to travel in the lane to more fully utilize the unused capacity, while improving the overall effectiveness of moving people and goods over the Midtown Corridor's roadways. While restricted access to the new lane by buses and HOVs only is a potential means of balancing travel demand in the lane, the intent of this proposal is to assess the option of applying Value Pricing techniques to manage demand in the new lane. The proposal seeks to evaluate the potential of Value Pricing to create more options and flexibility for travelers, and potentially improve service levels in the Midtown Corridor.

Description of the Proposed Pricing Program

The Port Authority is proposing an assessment of the impact on system-wide efficiency of a new bus lane that is shared with non-bus vehicles seeking a more reliable level of service during the a.m. peak hours in exchange for a premium toll rate.

Specifically, the proposal is designed to evaluate the options for allowing non-bus vehicular traffic access to a second Exclusive Bus Lane in one of the three eastbound lanes on the NJ Route 495 approach to the Lincoln Tunnel. This project will recommend an array of pricing alternatives that allow a vehicle mix that ensures a travel time advantage in the new managed lane, while also improving overall passenger movement during the weekday a.m. peak period.

For ease of operation and to further promote use of the E-ZPass electronic toll collection system, access to the lane would only be available to E-ZPass customers. A number of pricing scenarios for the new managed lane will be evaluated, including a fixed toll rate, as well as dynamically varying toll prices relative to the roadway's level of service and the time of day. The project will also assess the feasibility of combining pricing for occupancy, mode, and allowing a "FAIR

Lanes¹ credit system for access to the new managed lane. These scenarios are discussed in section V of the Project Tasks.

Background

The Port Authority of New York and New Jersey is a bistate agency that operates and maintains the six vehicular crossings connecting New York City and New Jersey. The Port Authority is in the process of developing a microscopic traffic simulation model for the interstate transportation corridor Midtown Manhattan through the Lincoln Tunnel. (Please refer to the Midtown Corridor in *Figure 1*). The Midtown Corridor connects northern New Jersey's roadways and Midtown Manhattan via NJ Route 495 (a limited access six-lane highway), and the Lincoln Tunnel (three, two-lane tunnels under the Hudson River). The corridor links the New Jersey Turnpike, Routes 1&9 and Route 3 approaches in Secaucus with the Lincoln Tunnel to New York City and the Port Authority Bus Terminal in Midtown Manhattan.

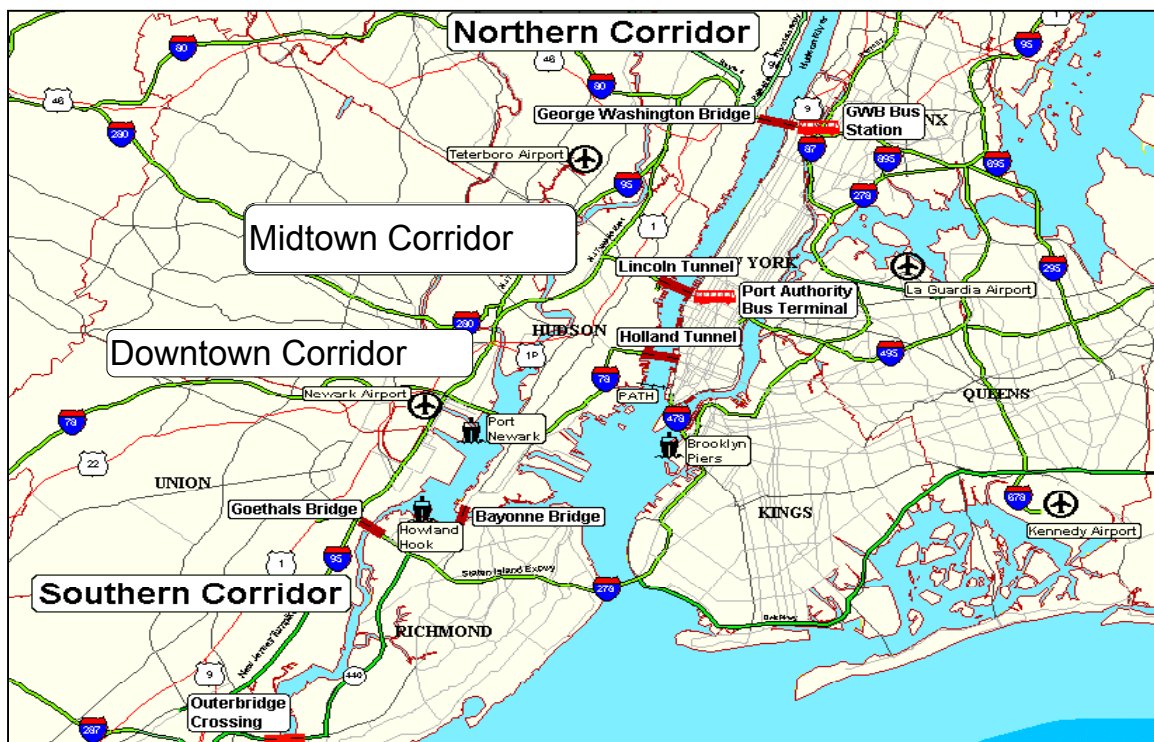


Figure 1. Interstate Transportation Corridors

The Midtown Corridor is a highly transit dominant corridor, enjoying a wide array of transit services that complement the roadway network. Transit options serving the corridor include New Jersey Transit/Amtrak passenger rail services, PATH's transit services, private ferry operations, as well as the Port Authority Bus Terminal (PABT) in midtown Manhattan and the Lincoln Tunnel's Exclusive Bus Lane (XBL). Several new transit improvements are underway that will positively affect public transportation within corridor including New Jersey Transit's Montclair Connection (implemented September 29, 2002) and the Secaucus Rail Transfer, restoration of PATH service to downtown Manhattan, and new and expanded ferry services

¹ FAIR Lanes is an acronym for "Fast and Intertwined Regular" Lanes. The concept has been developed by FHWA to address equity issues often raised in HOT lane conversions for toll operations.

between New Jersey and New York City. This project proposal is intended to ensure roadway management objectives harness this complementary network to maximize overall mobility.

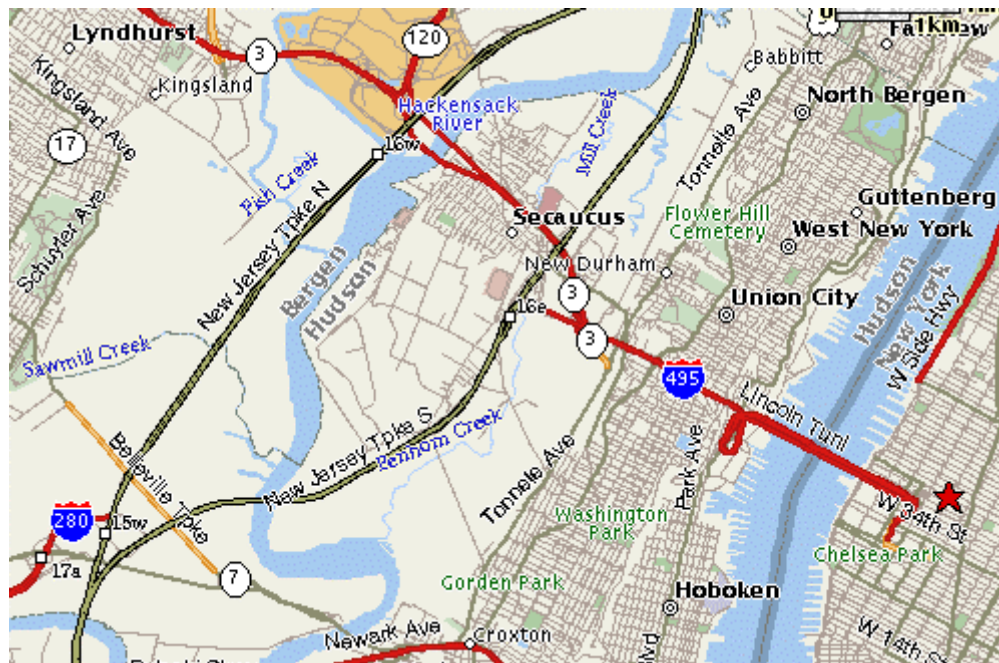


Figure 2. The Midtown Corridor.

The Existing Exclusive Bus Lane (XBL)

By 1970 bus demand had increased to the point where the PANYNJ, in conjunction with NJDOT, and the NJ Turnpike Authority, established the first dedicated bus lane of its type in the U.S. This landmark 2.5-mile counter-flow Exclusive Bus Lane facilitates eastbound morning peak bus movements (see Figure 3). The counter-flow bus lane begins at Interchange 17 of the New Jersey Turnpike continuing east along Route 495, through the Lincoln Tunnel toll plaza and onto the left lane of the center tube of the tunnel. It operates from approximately 6:15 a.m. to 10:00 a.m. on weekday mornings. Over 100 different bus carriers use the XBL today, with commuters saving 15 to 20 minutes when compared to traveling on the normal Route 495 approach.

Bus demand has increased tremendously over the years. In 1971, the XBL accommodated 206,000 buses with 8.7 million passengers. In 2000, bus volumes in the XBL more than doubled to 428,000 carrying 15.5 million passengers. Overall, it is estimated that since its inception, the XBL has served 400 million passengers in over 10 million buses. The volume of buses has steadily increased in this corridor. Today, 2,750 buses use the XBL during the 6-10 a.m. peak hours, accounting for approximately 75% of the morning commuters heading through the Lincoln Tunnel into Manhattan each weekday. However, this volume of bus activity reflects the capacity of the XBL in the peak hour. With bus demand projected to increase in the future according to the PANYNJ's internal evaluations and NJ Transit's independent review, additional capacity and greater reliability of the XBL operation will be required to ensure that the bus system works effectively and efficiently.

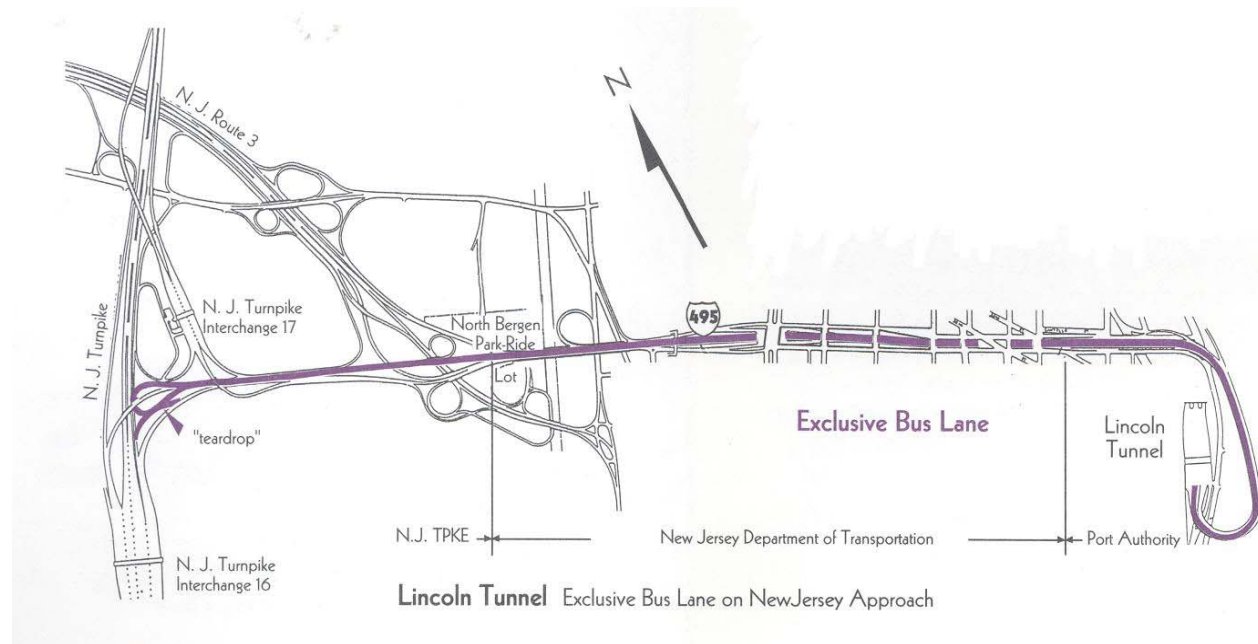


Figure 3. Exclusive Bus Lane – Eastbound counter-flow lane from NJ Turnpike to Lincoln Tunnel

Concurrent NJ Route 495 XBL II Feasibility Analysis and Traffic Simulation Study

The PANYNJ is currently launching two studies in the Midtown Corridor to assess traffic at the Lincoln Tunnel. The *NJ Route 495 XBL II Feasibility Analysis* is being undertaken in conjunction with Federal Transit Administration funding to evaluate the physical and operational feasibility of introducing a second bus lane (XBL II), including converting one of the three Lincoln Tunnel eastbound lanes and approaches into a second bus lane. The effort will assess the physical options, including roadway connections and lane separation, and operating considerations such as safety and enforcement. Although information garnered through the Feasibility Analysis will enhance our understanding of the physical and operational requirements, it will not affect commencement of this Value Pricing study.

A second study, the *Lincoln Tunnel Corridor Simulation Study*, already underway, is building an interactive, microscopic traffic simulation model of the Lincoln Tunnel and the Midtown Corridor to analyze traffic impacts under various conditions. The simulation model offers a tool to be used in conjunction with the options identified in the *NJ Route 495 XBL II Feasibility Analysis* to measure the impact of alternatives. Given that the bus demand is not likely to consume all the capacity of a second Exclusive Bus Lane, the *NJ Route 495 XBL II Feasibility Study* will consider various operating and design conditions that will allow auto access to balance the excess capacity of the new managed lane through various HOV treatments (i.e., HOV 2+, HOV 3+, etc.). The *XBL II Feasibility Study* will not develop specific pricing strategies as a way to fill the underutilized capacity in the new bus lane. The purpose of this project proposal for consideration by the Value Pricing Pilot Program is to assess the viability for pricing the remaining capacity to non-bus traffic by feeding demand-pricing information into the traffic simulation model currently under development. The simulation model is expected to be available in the 4th quarter of 2003, coinciding with requirements and project schedule of this project proposal..

The Value Pricing Project Objectives

This project proposal would consider whether value pricing is an appropriate mechanism for charging a higher toll for non-bus traffic wishing to take advantage of the reliability and the improved service levels in the new bus lane, while maximizing utilization of the underutilized capacity of this new managed lane. The overall objective is to enhance the efficiency of the corridor and regional transportation network through transit mode shifts and vehicular demand balancing with other crossings. Efficiency will be measured in terms of improved congestion levels, corridor reliability and mobility. An array of measures will be targeted to quantify the benefits of the additional managed lane including the number of passenger trips accommodated in the Midtown Corridor, travel time and average vehicular speeds through the peak period, enhanced bus system reliability and bus travel time predictability, bus ridership growth over time, and environmental impacts such as air quality.

The conversion of one of three regular eastbound travel lanes on Route 495 into a managed lane that may combine a priced premium service option with a priority bus lane serves several policy objectives. Among these policy objectives are:

- ensuring that the highly transit-oriented Midtown Corridor maintains an appropriate transit orientation on the roadway network, by creating incentives for bus travel through continued priority treatment of buses with an eye toward superior services levels;
- encouraging transit use and higher vehicle occupancy during the peak hours;
- creating incentives for peak-period motorists to divert to other corridors where peak-period congestion levels are less acute;
- creating service options for motorists that travel within the corridor during the peak period;
- exploring non-peak priority service options for the lane, including goods movement alternatives;
- augmenting the PANYNJ's interstate transportation revenue stream to fund ongoing operations and maintenance and new capital investment.

Social and Economic Effects

The major positive social objective of this project proposal is in the increased service level for buses through more reliable travel times. This enhanced service would meet increased demand for buses and may potentially increase bus ridership. As a consequence, overall passenger mobility into Midtown Manhattan may potentially be enhanced through efficiency gains. The related benefits of more effective bus mobility would not only benefit passengers riding buses, but also non-bus motorists since every bus removes up to 25 auto drivers from the congested roadway network.

The assessment of the specific impact on low-income users of the Lincoln Tunnel will be reviewed, but is not one of the central objectives of this proposal. However, one of the scenarios considered would evaluate the "FAIR Lane" concept whereby motorists who regularly use the remaining regular traffic lanes can earn credits that can be applied toward occasionally using the new lane.

Project Tasks

- I. Establish Oversight and Technical Committees with NJDOT, NJ Turnpike Authority, and the PANYNJ.

Involvement of our regional partners is essential in progressing any innovative ideas to successful implementation. The Port Authority clearly understands that any further steps towards implementation involve strict cooperation of all its regional partners including NJDOT and the New Jersey Turnpike Authority. To that end, the Port Authority will seek a cooperative agreement with NJDOT review the study findings and recommendations.

- II. Identify and review existing operations and research of current and proposed HOT lanes, as well as other managed lane applications. Assess pricing strategies that are currently in use or are under active consideration for such operations by other transportation agencies. Conduct a stakeholder outreach program designed to gain insights into issues, concerns and mobility needs with critical stakeholders through interviews and discussion groups.

This review of is designed to ensure that lessons learned from other experiences and that stakeholder issues are understood and incorporated in refining this scope of work establishing project priorities

- III. Employ the data collected for the PANYNJ's *Lincoln Tunnel Corridor Simulation Study* to establish the current and projected demand profiles for buses, the capacity of the existing XBL, and the potential "underutilized" capacity of a new second bus lane. These capacity and demand data, and their relationship through the peak period, will ultimately be able to be assessed using the PANYNJ's traffic simulation tool currently under development.

Defining the demand profiles for bus traffic and the lane capacities is critical to establishing the need for a second bus lane, the times it may operate, its operating characteristics (i.e., travel times, residual delays in regular travel lanes), and operating practices (e.g., permitted vehicle mix). The traffic simulation model developed in the *Lincoln Tunnel Corridor Simulation Study* will provide both data and an evaluation tool for this project.

- IV. Conduct a driver/passenger behavior survey using stated-preference techniques to establish the price elasticity of demand, as well as relationships between price and level of service. This survey task may include focus groups, questionnaires, web-based surveys, telephone surveys, and other market research tools to also determine the acceptability of the study concept with the public and other stakeholders as determined in consultation with selected consultants.
 - A. An up-to-date survey in the Midtown Corridor is required to determine driver and passenger preferences that are essential to establishing a predictive tool of travel behavior and motorist decision-making. This type of survey has not been done at the Lincoln Tunnel since 1994. In addition to the auto survey, peak-period commercial vehicles will be queried to ascertain their propensity to shift trips to

shoulder time periods to enjoy faster reliable travel time in exchange for an increased toll. Other basic data that the surveys may obtain include:

- basic trip profile information (vehicular trip frequency, transit use, use of other crossings),
- reported travel times and travel costs,
- reported travel delays and reliability,
- ability to use another alternative means of travel (transit, other crossings, carpool),
- flexibility to travel at different times of day (travel earlier or later),
- demographics, and
- facility ratings.

In order to focus the survey task, a prioritized list of survey goals has been established to ensure data collection efforts address the most critical outcomes.

1. Price elasticity of demand and its relationship relative to travel time and/or levels of service;
2. Potential for changing mode of travel to transit (bus/rail/ferry);
3. Potential diversion to other interstate vehicular crossings;
4. Potential for car pooling (increased vehicle occupancy);
5. Potential for shifting time of travel and arrival time at the Lincoln Tunnel approaches (including commercial vehicles).

B. A *Predictive Behavioral Travel Choice Model* will be developed from the survey data to reflect modal choice, lane choice, and time-of-day travel choice based upon various price and level of service inputs. Technically, a nested multinomial logit model may be developed. The model may also be required to predict traffic diversion to other facilities and the propensity for increased HOV activity (see VI.)

- V. The *Predictive Behavioral Travel Choice Model* will be required to interface with the *Lincoln Tunnel Traffic Simulation Model* currently under development in a VISSIM environment. The impact on vehicular and passenger throughput, travel time, delays, air quality and revenue will be evaluated using various scenarios.

The *Predictive Behavioral Travel Choice Model* would be integrated as a module in the Lincoln Tunnel traffic simulation. Therefore, based on Lincoln Tunnel Simulation output (including travel time differentials between lanes) and the pricing scenario (dynamic, static, etc.), we establish pricing changes for the lane. These pricing changes will drive the *Predictive Behavioral Travel Choice Model* to determine how many drivers will switch to the proposed lane, divert to transit, divert other facilities or shift their arrival time. These volume changes will again iteratively feed into the Lincoln Tunnel Simulation to produce new throughput and travel times differentials, consider a pricing review, which will lead to new traffic diversions (via the *Predictive Behavioral Travel Choice Model*), etc (see Figure 4). Ultimately, these pricing changes will induce drivers to fully utilize the capacity of the proposed lane.

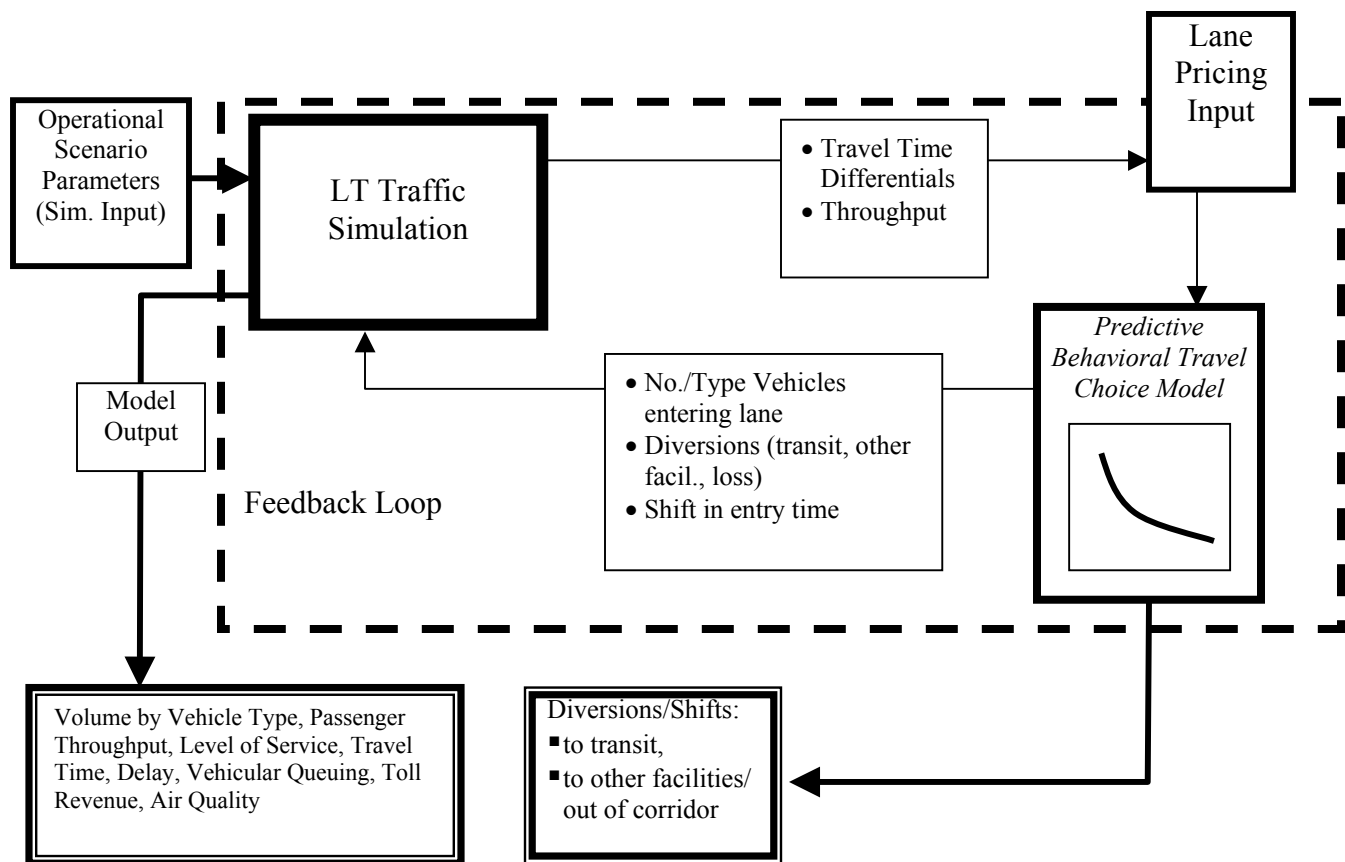


Figure 4. The Predictive Behavioral Travel Choice Model & the Lincoln Tunnel Corridor Simulation Model

The scenarios that will be considered are:

- A. Static Pricing - where E-ZPass vehicles pay a fixed higher toll to use the extra capacity available in the new managed lane.
- B. Dynamic Pricing – where the toll for E-ZPass vehicles changes relative to the lane’s benefit at any point in time and the available capacity of the new mixed-mode lane. The benefit of the lane may be measured in travel time, average roadway speed, level of service, or other means.
- C. Passenger Occupancy Pricing – where toll prices are designed to distinguish differing toll rates for single-occupant autos, and HOV autos (e.g., two-plus, 3-plus, etc.) to encourage higher vehicle occupancy.
- D. Commercial Vehicle Pricing – where trucks or certain targeted segments of the commercial market (i.e., small package delivery, etc.) are able to access the extra capacity of the new managed lane at designated time periods and prices.
- E. Equity Credits – modeled after the “FAIR lanes” concept, undertake an assessment of the potential to allow access to the additional capacity of the new managed lane for use by users of the traveled in the regular traffic lanes remaining lanes that are otherwise adversely affected. Under this option,

drivers in the regular lanes would be compensated with credits that could ultimately be used as a toll payment to access the new managed lane. The credits would compensate motorists for giving up their right to use of the converted XBL-II lane and create more options for motorists. This task is a supplementary element of the project scope that is not essential to accomplishing the primary project objectives.

- F. Other scenarios including combinations of scenarios.
- VI. Modify the New York Metropolitan Transportation Council's *Best Practices Model* to allow a sub-regional analysis of corridor-wide and system-wide impacts of selected scenarios. The modified Best Practices Model will use output from the *Lincoln Tunnel Traffic Simulation Model* to:
- A. Determine the impact of diversion to other vehicular crossings
 - B. Evaluate impact of trips diverted to transit modes
 - C. Evaluate air quality/environmental impacts by analyzing changes in travel time, vehicular queuing, traffic volumes, and vehicle-miles-traveled.
 - D. Other impacts
- VII. Develop recommendations – define criteria for evaluating scenario outcomes and rate each.
- VIII. Review implementation considerations
- A. Technology
 - B. Occupancy-Based Pricing Requirements (e.g., enforcement, lane equipment, etc.)
 - C. Price Elasticity Sensitivity
 - D. Institutional, Policy and Design Issues
 - E. Implementation Costs
- IX. Develop overall report and conclusions

Preliminary Project Schedule

It is expected that the project will take two years to complete. The major project schedule elements are depicted in the chart below.

Project Time Frame	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	5th Qtr	6th Qtr	7th Qtr	8th Qtr
I. Creating Oversight/Tech Committees								
II. Assessing other HOT pricing studies and Conducting preliminary interviews/focus groups to incorporate public stakeholder input.								
III, IV. Conducting Stated Preference and public/stakeholder Survey/developing model, establishing bus demand (LT Simulation Study)								
V. Configuring scenarios for VISSIM (elasticity algorithm /running 10 scenarios)								
VI. Modifying Best Practices Model and Evaluating Regional Impacts								
VII., VIII., IX., Developing preliminary recommendations, reviewing implementation considerations, developing overall report & conclusions								

Preliminary Project Financial Plan

Cost estimate for conducting this project is \$1,320,000 (including \$245,000 in PANYNJ in-kind services).

I.	Create Oversight and Technical Advisory Committees. (in-kind PANYNJ services).	\$5,000
II.	Assess other HOT lane pricing applications (in-kind PANYNJ services) and conduct preliminary interviews/focus groups to incorporate public/stakeholder concern in study scope.	\$45,000
III.	Establish baseline bus demand thresholds and projections. Coordinate data with the <i>Lincoln Tunnel Traffic Simulation Model</i> (in-kind PANYNJ services).	\$20,000
IV.	Conduct in-depth Public/Stakeholder outreach to evaluate buy-in potential and conduct Stated-Preference Travel Survey and develop a <i>Predictive Behavioral Travel Choice Model</i> .	\$650,000
	A. Conduct initial focus groups, define data collection methodologies, and design survey instruments for target audiences (i.e., auto drivers, bus passengers, commercial vehicle operators).	
	B. Develop survey questions, goals.	
	C. Process survey data (statistics, etc).	
	D. Develop a <i>Predictive Behavioral Travel Choice Model</i> using the survey results.	
V.	Configure scenarios for input to VISSIM	\$250,000
	A. Establish interface between the <i>Predictive Behavioral Travel Choice Model</i> and the VISSIM-based <i>Lincoln Tunnel Traffic Simulation Model</i> that allows multiple scenario testing and iterative analysis.	
	B. Develop, process and evaluate ten scenarios	
VI.	Run scenarios on using the NYMTC Best Practices Model	\$225,000
	A. Modify Best Practice Model to break out Midtown Corridor roadways and approaches (Lincoln and Holland Tunnels)	
	B. Develop and evaluate 10 scenarios	
VII., VIII., IX.,	Develop preliminary recommendations, review implementation considerations, develop overall report and conclusions (in-kind PANYNJ services).	\$50,000
	Other in kind services (contract administration, project management, technical support)	\$75,000
TOTAL		\$1,320,000